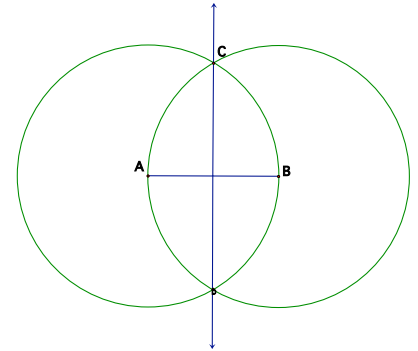


## Sketchpad Lab: Bisectors

In this Activity, you'll only use sketchpads' freehand tools (in the toolbox) to construct perpendicular bisectors. You'll investigate properties of perpendicular bisectors.

1. Construct  $\overline{AB}$ .
2. Construct circle A with radius  $\overline{AB}$ . (Make sure you use point A for the center and point B for the radius endpoint.)
3. Construct circle B with radius  $\overline{BA}$ . (Make sure you use point B for the center and point A for the radius endpoint.)
4. Construct  $\overline{CD}$ , where C and D are the circle's points of intersection.



5. Drag points A and B to make sure your construction stays together. Your sketch should look like the picture.

**Question 1:**  $\overline{CD}$  is the perpendicular bisector of  $\overline{AB}$ . Without measuring, what can you say about distances AC & BC and the distances AD & BD?

6. Construct E, the point of intersection of  $\overline{AB}$  and  $\overline{CD}$ .

**Question 2:** What special about E? Move points A and B to confirm your answer.

7. Hide the circles.

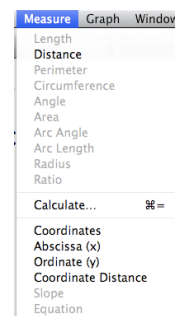
•To Hide the circles, use your selection tool and click on the circles. (Make sure nothing else is selected) Click on the display menu and choose hide circles. If "Hide Circles" is in grey, you are doing it wrong!



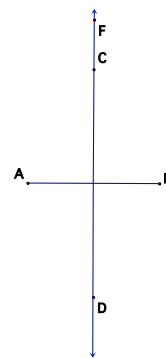
8. Construct F on  $\overline{CD}$ .

9. Measure the FA & FB.

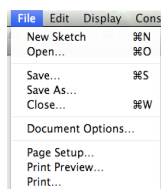
•To measure the distance, select two points; in the measure menu, choose distance.



**Question 3:** Drag F up and down the line. Make a conjecture about any point on a segment's perpendicular bisector.



An *angle* bisector is a ray that has its endpoint at the vertex of the angle and that divides the angle into two angles of equal measure. (I hope this review for you!) In this part of the investigation, you'll investigate a special property of points on an angle bisector.



**10.** Click on File menu and select document options. Add a blank page. If this is too complicated for you, just click file-new sketch.

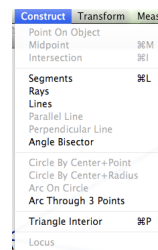
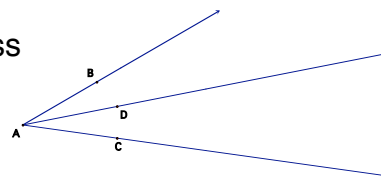
**11.** Select the ray tool from your toolbox and construct  $\overrightarrow{AB}$  &  $\overrightarrow{AC}$  to form  $\angle ABC$ .

**12.** Construct the the bisector of  $\angle BAC$ .

- To construct the the bisector, select, in order, B, A, and C. In the construct menu, choose angle bisector.

**13.** Construct point D on the angle bisector.

**Question 4:** Drag point D. Without measuring, make a guess about the distances from point D to each of the angles two sides.



**14.** Measure the distance from D to  $\overrightarrow{AB}$ .

- To measure the distance, select D and  $\overrightarrow{AB}$ , in the measure menu, select distance.

**15.** Measure the distance from D to  $\overrightarrow{AC}$ .

**16.** Measure  $\angle BAD$  &  $\angle DAC$ .

**Question 5:** Drag A, B, or C. to change  $\angle BAC$ . How do the measures of  $\angle BAD$  and  $\angle DAC$  compare?

**Question 6:** Drag Point D and observe the distance from point D to the two sides of the angle. Write a conjecture about any point on angle bisector.